

Listing of Claims:

Claims 1-10 (canceled)

Claim 11 (currently amended): A polymer actuator comprising: a plurality of gel/electrode complexes arranged in an electrolytic aqueous solution, at least one of said gel/electrode complexes being composed of a polymer gel containing acidic functional groups and electrode placed within the polymer gel and at least one of said gel/electrode complexes being composed of a polymer gel containing basic functional groups and electrode placed within the polymer gel, said electrodes being made of a material capable of occluding and releasing hydrogen electrochemically, such that the polymer gel in each gel/electrode complex changes in pH due to occlusion or release of hydrogen from the electrode due to application of voltage across the electrodes of the gel/electrode complexes, wherein the pH change in the polymer gel is achieved without the evolution of gas and the consumption of water, and each of the gel/electrode complexes changes in volume in response to the pH change.

Claim 12 (previously presented): The polymer actuator as defined in Claim 11, wherein the electrode of the gel/electrode complex is made of any one of palladium and palladium-containing alloy.

Claim 13 (previously presented): The polymer actuator as defined in Claim 11, wherein the electrode of the gel/electrode complex is made of hydrogen-occluding alloy coated with palladium.

Claim 14 (previously presented): The polymer actuator as defined in Claim 11, wherein the electrode of the gel/electrode complex is in a form selected from the group consisting of a coil and a mesh.

Claim 15 (previously presented): The polymer actuator as defined in Claim 11, wherein the electrode of the gel/electrode complex is in a form that includes any one of a granule and a fiber which is dispersed in the polymer gel.

Claim 16 (previously presented): The polymer actuator as defined in Claim 11, wherein the electrode of the gel/electrode complex is composed of any one of a coiled and a mesh-like object and any one of a granular and a fibrous object.

Claim 17 (previously presented): The polymer actuator as defined in Claim 11 which has more than one unit of the gel/electrode complex formed from a polymer gel containing acidic functional groups and more than one unit of the gel/electrode complex formed from a polymer gel containing basic functional groups.

Claim 18 (previously presented): The polymer actuator as defined in Claim 11, wherein the polymer gel of the gel/electrode complex contains a mixture of a polymer containing acidic functional groups and a polymer containing basic functional groups.

Claim 19 (previously presented): The polymer actuator as defined in Claim 11, wherein the gel/electrode complexes are arranged in a container which is filled with said electrolytic solution and said container has electrodes projecting from both ends.

Claim 20 (previously presented): The polymer actuator as defined in Claim 19, wherein said container is capable of expanding or contracting in response to the volume change of the gel/electrode complexes.

Claim 21 (previously presented): The polymer actuator as defined in Claim 11, wherein the acidic gel/electrode complexes contracts upon hydrogen ion release from the electrode, and expands upon occlusion of hydrogen ion into the electrode.

Claim 22 (previously presented): The polymer actuator as defined in Claim 11, wherein the basic gel/electrode complexes expands upon hydrogen ion release from the electrode, and contracts upon occlusion of hydrogen ion into the electrode.

Claim 23 (previously presented): The polymer actuator as defined in Claim 11, wherein the acidic gel/electrode complexes and the basic gel/electrode complex both contract and expand in the same direction upon application of voltage.